SOLUTION OF THE PASTURAGE PROBLEM.

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As it appears in *Newton's Universal Arithmetic,* Wilder's Edition, page 189, Problem XI, the general problem reads: "If the number of oxen a eat up the meadow b in the time c; and the number of oxen d eat up as good a piece of pasture e in the time f, and the grass grows uniformly; to find how many oxen will eat up the like pasture g in the time h."

If b acres of pasture, and the grass that grows on it during that time, keep a oxen c weeks, one ox eats $b \div a$ of an acre, and its growth during that time; and he eats $1 \div c$ as much in one week, or $b \div ac$ of an acre and $b \div a$ of what grows on one acre in one week, supposing a week to be the unit of time.

In the second case, e acres pasture d oxen f weeks, and one ox eats $e \div d$ of an acre, and what grows on it during that time; and in one week he eats $1 \div f$ as much, or $e \div df$ of an acre and $e \div d$ of what grows on an acre during a week.

Now, since one ox eats the same quantity of grass in one week in each case, therefore $e \div d - b \div a = (ae - bd) \div ad$ of the growth of one acre during one week is equal to $\frac{b}{ac} - \frac{e}{df} = \frac{bdf - ace}{acdf}$ of an acre; and

$$\frac{bdf - ace}{acdf} \div \frac{ac - bd}{ad} = \frac{bdf - ace}{cf(ae - bd)}$$

of an acre, is the growth of an acre during one week.

$$\frac{b}{ac} + \frac{b}{a} \text{ of } \frac{bdf - ace}{cf(ae - bd)} = \frac{be(f - c)}{cf(ae - bd)},$$

the part of the original quantity on one acre which each ox eats in one week.

$\frac{beh(f - c)}{cf(ae - bd)}$ = quantity of grass, in acres, one ox will eat in h weeks.

$g + \frac{gh(bdf - ace)}{cf(ae - bd)}$ = quantity of grass, in acres, to be eaten from g acres of pasture in h weeks; and

$$\left[g + \frac{gh(bdf - ace)}{cf(ae - bd)}\right] \div \frac{beh(f - c)}{cf(ae - bd)} = \frac{cfg(ae - bd) + gh(bdf - ace)}{beh(f - c)},$$

is the number of oxen required to eat it, which agrees with Newton's result.

The foregoing method of solution is believed to be original. I published a numerical solution by this method in the April No. of *Our Schoolday Visitor* for 1868, page 109, and have since published similar solutions in several other periodicals.